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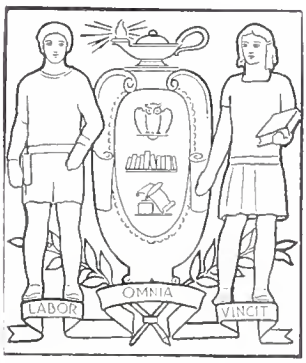
SIGHT CONSERVATION AND SIGHT-SAVING CLASSES



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SIGHT CONSERVATION

MEMBERS of the White House Conference Committee on the Physically and Mentally Handicapped Child proposed as a basis for their study, a bill of rights for the handicapped child which reads, in part, as follows:

The handicapped child has a right:
1. To as vigorous a body as human skill can give him.
2. To an education so adapted to his handicap that he can be economically independent and have the chance for the fullest life of which he is capable.
3. To a life on which his handicap casts no shadow.
4. To grow up in a world which does not set him apart.

A special study made of visual defects in the children of the first to the eighth grades in school districts of the fourth class by the medical inspectors of the Department of Health in the past year show that out of 150,000 children examined, 5,239 showed a visual acuity of "70" or less in one or both eyes. That is to say, a pupil standing twenty feet away from the eye chart can see only the letters which are large enough to be seen by the normal eye at seventy feet. Such a condition calls for our every effort in both prevention and correction. This bulletin is prepared with both of these needs in view. We need to be better informed concerning those conditions in the school that doubtless are contributing factors to impaired vision so they may be remedied.

This bulletin represents a cooperative effort on the part of the Departments of Health, Welfare and Public Instruction. The following members of these departments have either contributed material which has been incorporated in the manuscript or have been most helpful in reading the bulletin and offering constructive suggestions for improvement:

Doctor Paul Rothfuss, Deputy Secretary of Health, Department of Health; Mr. John German, Chief of Medical Inspection, Department of Health; Doctor Mary Riggs Noble, Chief of Pre-school Division, Department of Health; Miss Evelyn M. Carpenter, Supervisor of Conservation of Vision, Department of Welfare; Mr. S. Mervyn Sinclair, Executive Director of the Council for the Blind, Department of Welfare; Doctor Frank H. Reiter, Chief of Special Education, Department of Public Instruction; Doctor HuBert C. Eicher, Chief of School Buildings, Department of Public Instruction.

The bulletin is one of a series of publications on subjects closely related to the general curriculum under the direction of Mr. W. H. Bristow, Director of the Bureau of School Curriculum, Department of Public Instruction, and was prepared by Mr. W. G. Moorhead, Chief, Health and Physical Education, with the assistance of the committee named above. Preparation for printing is the work of D. M. Cresswell, Department Editor.

LESTER K. ADE
Superintendent of Public Instruction

June, 1935.

PENNSYLVANIA'S SIGHT-SAVING PROGRAM

1. The development of a program in the school and in the community which will use every facility to conserve and promote eye health.
2. Insure for each child a classroom environment which will provide the conditions and facilities necessary for the conservation of vision.
3. The setting up of a program which will detect eye defects and secure their correction, insofar as possible.
4. Establishment of sight-saving classes in the public schools as an essential part of an effective sight conservation program.
5. Emphasis upon eye health as an integral part of the general health program of the school.
6. Development of cooperative relationships with all agencies, both public and private, having a contribution to make to a sight-saving program.
7. Cooperation with the family and all available resources of the community to provide remedial care in sight-saving cases.
8. Establishment of a program which will insure that all teachers in the school share their knowledge of the child's health so that this information may be used to the best advantage in the larger program of sight conservation.
9. Establishment of cooperative working relationships with the services of trained ophthalmologists.
10. An organization of courses of study and curriculum materials to include essential information and experiences so that the child may assume his share of the responsibility in the conservation of his own sight and in the protection of that of others.

SIGHT CONSERVATION AND SIGHT-SAVING CLASSES

HOW THE EYE FUNCTIONS

THE eye can be compared with a camera in which the lens of the camera is represented by the refracting media of the eye, the dark chamber of the camera is the space enclosed by the choroid, the sensitive film of the camera is the retina, the shutter of the camera is the iris, and the aperture of the camera is the pupil. The eye is automatic in that it focuses itself for all distances, by the action of the muscle of accommodation, which controls the shape of the lens. It regulates the size of the aperture, or pupil, according to the amount of light present. This is done automatically by the circular and radiating muscle fibres of the iris. It renews its own films by the power of quickly eradicating images formed on the retina.

EYE DEFECTS MOST GENERALLY FOUND IN SCHOOL CHILDREN

Myopia (nearsightedness) is the most easily discovered by observation and the simple vision tests employed by the school physicians. The pupil will hold his book close to his eyes and he will either complain of inability to see clearly the work that is being demonstrated on the blackboard, or he will show a lack of interest in it. The vision test will indicate the severity of the defect. Most of these errors can be corrected to normal with the proper glasses.

Hyperopia (farsightedness) is seldom located until considerable damage has been done. The child sees distant objects perfectly and comfortably so his vision is recorded as normal. It becomes the responsibility of the teacher, then, to observe external symptoms which indicate the defect. Sties, inflamed lids, crustiness of lashes, and watery eyes are evidences of eye strain. Frequently, headaches and upset stomachs result when a pupil tries to accommodate his far-seeing eyes to close-range tasks. The hyperopic boy or girl who cannot bear the discomfort of trying to see at close range is mischievous in school and often the repeater, the truant, and later, the community problem.

Astigmatism is very frequently associated with farsightedness. It is characterized by tilting of the head to one side or the other, occasionally forward or back, in an effort to get just the proper slant on the written page so it may be seen clearly.

All these symptoms and mannerisms in seeing are deviations from normal and should be brought to the attention of the eye specialist.

WHAT TEACHERS AND PARENTS SHOULD KNOW

1. They should be familiar with the common appearance of the normal eye and its appendages, in order that they may detect gross departures from such a standard.
2. A knowledge of the hygiene of the eye and an understanding of the principles of proper room illumination.

3. Knowledge of and ability to recognize certain signs and symptoms which suggest the possibility of eye and vision defects. These should include:
   a. Symptoms of asthenopia (eyestrain), such as headache, tiring of the eyes, inflammation of the lids (blepharitis), dizziness, occasional blurring of vision.
   b. Unnatural postures in reading or writing, often suggesting nearsight, astigmatism or other defects of vision.
   c. Backwardness in studies.
   d. Signs of the various inflammations of the eye and its appendages, some of which, such as "Pink Eye", are highly contagious. Such signs include watering of the eyes, redness of the eyes, or the linings of the lids, discharge from the corners of the eyelids, swelling of the lids or any part of them.

ESSENTIALS OF SCHOOLROOM ENVIRONMENT RECOMMENDED FOR CONSERVATION OF VISION

Inasmuch as two chief factors in producing eye strain are insufficient light and glare, we must therefore be concerned with all things that contribute to either or both of these factors. Glare can be avoided by the proper diffusion of light, the elimination of highly polished glossy surfaces, and prevention of sharp contrasts such as a bright light against a dark background. Adequate daylight in all parts of a school building produces the ideal lighting for which we should all strive.

Modern educational methods impose upon the eyes of school children a greater strain and duty than ever before. Therefore, it is desirable and essential that school buildings be equipped with artificial lighting. It seems a simple matter to place fixtures in a schoolroom, but studies made of schoolroom lighting with a sight-meter (an instrument used for measuring the intensity of light, either natural or artificial, in foot candles) gives an accurate measurement of the needs. Schoolroom lighting should include proper light without glare, equally distributed in all parts of the room.

A. Natural Lighting

1. Glass area
   a. Windows
      (1) An amount as large as structural and architectural limitations permit. The light should equal at least 20% or 1/5 of the floor area. Windows should be on one side only (unilateral) on the long axis of the room. Windows located on one side (long axis) and also the rear are used occasionally but generally speaking, they restrict the plan and area. If light from two sides of the room (bilateral) is used, the light area should be increased to 25% or 1/4 of the floor area. Cross lighting (opposite sides) and light coming from the front of seated pupils is not permitted.
      (2) Lower glass line should be from 3′ 4″ to 4′ from the floor.

(3) Distance from floor to top of glass at least 1/2 the width of the room.

(4) Distance from front of the room to windows 4′ to 8′ or at line of front row of desks.

(5) Distance from the rear of room to the windows should be as little as practicable—not more than line at front of the last row of seats.

b. Sky lights

(1) When window light is insufficient and must be supplemented by over-head lighting, such over-head construction should be of the monitor and saw-tooth type. Diffusing sashes are desirable. They should be drained for carrying off moisture and made easily accessible for cleaning purposes. The light area of sky lights and diffusing sash should be twice the area required for side lighting. Light divisions should be small and wire glass should be used.

2. Intensity

Minimum illumination on desks and blackboards should be 12 foot candles.

3. Direction of light

a. Unilateral lighting is recommended and should come from left of pupils only. Where light comes from both the left and the rear of pupils, less than 50% should come from the rear.

b. Seats should be turned slightly away from windows.

c. Neither pupils nor teachers should face windows. A teacher should never stand at the side of the room with her back to the windows when this position might require the pupils to face in her direction.

4. Exposure

Windows facing northeast, northwest, east, or west are preferred.

Windows should never face north or south.

5. Diffusion

a. Shades of sufficient density should be provided so that the surface brightness will not cause glare when sun shines on them. These shades should be light and translucent. The color should be light tan, buff or straw.

b. The best light comes from the top of the windows. Shades should be so adjusted that the pupils fartherest from the window may receive the benefit of this light.

c. Window shades provided for school buildings should be of the double type with both rollers at or near the center of the window so that one shade is pulled up while the other is pulled down. A shade should be wide enough to extend over the mullions, and the fixture in the center should be so adjusted as to eliminate light spots or glares.

d. Shades should be of durable quality to prevent cracking and of ample size so that light cannot enter at the sides or bottom of the rollers. They should be provided with backing between the rollers to prevent leakage of light.

e. Where light from the sun or sky is obstructed, refracting glass should be used in the upper parts of the windows so as to re-direct light to the far side of the room.

6. Reduction of glare

a. No seating plan or arrangement of blackboard should be provided which compels pupils to face windows.

b. The mullions between windows should be narrow so as to prevent casting of shadows.

c. Walls of adjacent buildings visible from windows should be finished in a color light enough to reflect light but dull in finish so as to reduce glare.

B. Artificial Lighting

1. Intensity

The unit of measurement of light intensity is the candle, a 50-watt incandescent bulb gives approximately 50 candlepower. The unit of intensity of an illuminated surface is the foot candle. A foot candle is a standard unit of light just as a degree is the measurement of temperature. It represents the amount of light a candle will cast on a surface placed one foot away.

a. Artificial lighting for the entire building is essential. The source of supply should be sufficient to insure continuity of service and steadiness of light.

b. Recommended illumination for regular classrooms for normal print is 15 foot candles; for special rooms, library, laboratory, shops, and offices, 15 foot candles; for art, drawing, sewing, finishing, rooms, etc., 25 foot candles.

2, Types of luminaires

a. Luminaire units are classified as direct, semi-direct and enclosing. A direct unit is one in which the reflector sends all the light downward. This is the most efficient type, but also the one most likely to produce glare, either from the light bulb itself or indirectly by reflection from books, tables, and blackboards. Indirect units are inverted opaque bowls which send all the light to the ceiling from whence it is diffusely reflected around the room. This is the best type for avoiding all possible glare, but is entirely unsatisfactory unless ceilings are white or ivory in color. It is often inefficient, especially if the reflectors are not frequently cleaned. Semi-indirect reflectors allow a little light to pass through, but send most of it from the ceiling. They are less glare proof than the total indirect units, but suffer from the same defects of maintenance and inefficiency. The enclosing unit is generally a diffusing glass globe totally surrounding the bulb. It is relatively free from glare if hung high enough from the floor, and gives a good distribution of light. All units should be

installed so that the row of lights can be switched on separately from the rest so as to supplement the lighting on the desks, in the darker part of the room.

b. Indirect units which direct all light to the ceiling, or semi-direct units directing more than half of the light to the ceiling should be used to give a good distribution of light.

c. The lighting source should be enclosed or covered from vision, glare from the unit avoided, shadows soft and graded.

d. The luminaire or fixture should be simple in design, well proportioned, and in harmonious relation with the decorative and architectural features of the surroundings. The contour of the unit and quality of material should be carefully considered to secure maximum efficiency of luminaire and lamp. Under certain conditions, reflection of light from blackboards makes it desirable to recommend a local, well-shaded, artificial light above the board. This will eliminate this type of glare.

3. Distribution

a. Spacing between luminaires not over 1 1/2 times the distance from desk top to luminaire (or to ceiling if using indirect type).

b. Approximately equal spacing between luminaires (in either direction); distance between wall and luminaire about 1/2 of space between luminaires, if there is an aisle next to wall, or 1/3 of space if work place is next to wall.

c. Size and shape of enclosing globes selected to suit spacing of luminaires in order to prevent marked shadows.

d. Control apparatus so arranged that illumination in room can be equalized by turning on light in darker places only.

4. Diffusion

Luminaire globes translucent and sufficiently dense to conceal light source.

5. Absence of glare

a. To reduce glare, the surface brightness of the luminaire globe should be low, (under 3 foot candles per square inch). Recommended minimum diameters of enclosing globes:

75-watt lamps	10 in. globe
100- " "	12 " "
150- " "	14 " "
200- " "	16 " "
300- " "	18 " "

b. Luminaires placed well above line of vision of pupils.

c. Avoid placement of light against a dark background.

6. Maintenance

a. Selection of light units which can be easily cleaned.

b. Regular thorough cleaning of luminaires, at least once a month for indirect units, sufficient to prevent reduction in illumination.

e. Regular inspection of lighting to include testing of intensity and replacement of bulbs, etc., suffieient to maintain standards set, at least every month. A simple test ean be made of the amount of light on pupils' desks by the use of a sight-meter.

C. Classroom Decorations, Furnishings and Equipment

1. Color
   a. Colors most satisfactory for walls are light buff, light warm gray, dark cream, grayish green.
   b. Upper walls should have a reflection value of 50%. Dark eolors may be used below level of the window sills.
   e. The ceiling should be white, ivory or light cream and have an 80% reflection value.
   d. All eolor should be used so as to obtain reflection with a maximum of diffusion. A glare from any walls must be avoided. Warm colors are suggested in rooms with northern exposure and cool colors for rooms with southern exposure.
2. Furnishings
   Only dull finishes on blackboards, woodwork, furniture, etc. No glazed or shiny polished surfaces.
3. Blackboards
   a. A natural high grade slate free from ribbons and other defects with a dull finish should be provided.
   b. They should not be placed beneath a window or between two windows and it is preferable not to plaee them on the window side of the room. They should not extend into the corners of the room. The best loeations are on the front and the right side of the seated pupils.
4. Seats and desks
   a. Seats should be adjustable for height and should be adjusted to the present user. The height of the desk should be 2″ or 3″ above the elbow height of the child when sitting erect. The edge of the desk should over-hang the front edge of the seat from ½″ to 1″.
   b. Desk tops should preferably be adjustable to lift to an angle.
   c. All seats and desks should be movable so that position can be changed in order to seeure the best light at all times.
5. Books, maps, etc.
   a. Avoid use of glossy paper in books, maps, ete.
   b. In selecting textbooks, the following faetors are important:
      (1) The size of the print should be large enough so that children of the age for whieh the books are designed may read it without strain.
      (2) The kind of print should be a plain block type which is easily read. Any kind of old English type and other fancy lettering should be avoided.
      (3) A long line eauses fatigue of eye muscles, therefore, short lines are preferable.
      (4) Printing should be on unglazed paper.

SIGHT-SAVING CLASSES

The establishment of sight-saving classes in the public schools is an essential part of the sight conservation program. Many of the children who are suitable pupils for sight-saving classes are exceedingly near-sighted and myopic. Frequently the excessive strain placed on over-strained eyes by these near-sighted children in their efforts to see—particularly ordinary print or small objects—results in total blindness, due to the fact that the retina, the part of the eye sensitive to light, is torn away from its attachments. This type of near-sightedness usually is progressive until the individual is approximately sixteen years of age when its progress is arrested. Any preventive measures obviating eye strain will reduce the possibilities for decreased visual acuity or total blindness.

The vision of children suffering from all types of visual defects seems to improve after being placed in sight-saving classes. This improvement is only apparent and is the result of optimum lighting conditions, special supplies and equipment, and the special methods of instruction effective in sight-saving classes. The defect is not overcome or corrected, but it is alleviated through the compensations of sight-saving classes. Sight-saving classes serve a double purpose: (1) to conserve sight and (2) to provide an adequate educational opportunity for children to whom it would be denied otherwise.

Section 1413 of the School Code provides for the establishment of sight-saving classes in the public schools:

"The county or district superintendent of schools shall submit to the board or boards of school directors plans for establishing and maintaining special classes in the public schools or special public schools for the proper education and training of all such children reported to him as fit subjects for special education and training, and it shall be the duty of the board of directors of any district having such children to provide and maintain, or to jointly provide and maintain with neighboring districts, such special classes or schools."

This provision assumes that there are ten or more children within a given district or a sufficient number in addition to those residing in a neighboring district, requiring this type of educational treatment for the organization of a class.

This same section of the School Code places responsibility for reporting children, suspected of having poor vision, to the proper authorities for preliminary examination.

"It shall be the duty of the secretary of the school board, teachers, school enumerators, and attendance officers, in every school district in this Commonwealth, in accordance with rules of procedure prescribed by the Superintendent of Public Instruction, to secure information and report to the medical inspector of the school district and to the district or county superintendent of schools, on or before the fifteenth day of October of each year, every child within said district * * * who, because of apparent exceptional physical or mental condition, is not being properly educated and trained, and as soon thereafter as possible, the medical inspector shall examine such child, in accordance with rules of procedure prescribed by the Secretary of Health, and report whether such child is a fit subject for special education and training."

Children who have been certified as candidates for special education in sight-saving classes should be referred to a certified ophthalmologist for final examination.

ORGANIZATION AND ADMINISTRATION

"The State Superintendent of Public Instruction shall superintend the organization of such special classes (sight-saving, et cetera) and such other arrangements for special education, and shall enforce the provisions of this act."

The same section also provides for standards of administration and special reimbursement.

"School districts maintaining special classes in the public schools or special public schools * * * as hereinbefore specified in this section, shall receive reimbursement, as provided by law, so long as such classes, such schools, and such special education are approved by the State Council of Education as to location, constitution and size of classes, conditions of admission and discharge of pupils, equipment, courses of study, methods of instruction, and qualifications of teachers."

The State Council of Education at a regular meeting, October 4, 1926, approved the following standards for sight-saving classes:

A. Location

"Sight conservation classes shall be so situated that they will receive uniform natural illumination with no glare. A northern exposure is preferable.

A northern exposure permits of only a very small quantity, if any, of sun rays entering the room so that other exposures have been suggested and even recommended. However, since the pupils spend only a relatively small portion of the day in school and not continuously in the homeroom or school building, optimum lighting conditions for children in sight-saving classes should receive first consideration rather than exposure to the direct rays of the sun.

B. Constitution

"Sight conservation classes or classes for the partially blind, shall include children with eyesight so defective that they are unable to progress satisfactorily under usual classroom conditions and methods of instruction."

Pupils with not more than 20/70 vision or less than 20/200 vision in the better eye are regarded eligible for enrollment in sight conservation classes. However, there may be other conditions transitory in nature which might indicate the feasibility of placing a child in a sight-saving class temporarily. A child with a progressive defect, having more than 20/70 vision in the better eye might be placed in a sight-saving class, as a precautionary measure, upon the advice of an ophthalmologist. Quantitative limits of visual acuity should not be strictly applied, but the advice of an ophthalmologist should be decisive.

C. Size of Class

The maximum enrollment for a sight-saving class is twelve. The number is small because the pupils vary in chronological ages, educational achievement and ability and require a great deal of individual attention. If it happens that only three grades or even four are represented in a sight-saving class, the maximum enrollment may be increased to fifteen.

D. Conditions of Admission and Discharge of Pupils

After the stipulations of the School Code have been followed in the preliminary selection of children for sight-saving classes, such children should be referred to a certified oculist (ophthalmologist) whose advice is accepted as final.

E. Equipment

"Sight-saving classes shall be equipped with movable, adjustable top desks, typewriters, 24 point type textbooks, paper especially prepared and adapted for sight conservation classes.

"There shall be equipment for handwork, including woodwork, basketry, weaving and any manual activity which may be adapted to this particular handicap.

"The window glass line shall be approximately 42" from the floor. There shall be six ceiling outlets for artificial indirect illumination in a classroom of regulation size."

Explicit specifications regarding equipment for sight conservation classes may be obtained from the Special Education Division, Department of Public Instruction, Harrisburg.

F. Course of Study and Methods of Instruction

"Courses of study and methods of instruction for sight-saving classes shall be subject to the inspection and supervision of the Department of Public Instruction and approved by it." A sight-saving class is really a homeroom in which the pupils with defective vision acquire certain skills not taught in the regular grades to conserve vision and in which he prepares his educational assignments with the guidance and necessary assistance of a specially prepared teacher.

Textbooks with 24 point type print as the minimum size on carefully selected paper regarding color tone and surface are necessary. The number of these textbooks available in the different subjects corresponding to the texts distributed by commercial textbook companies is limited. It, therefore, becomes necessary for someone to read out of standard textbooks to pupils in sight-saving classes and to assist them in preparing regular assignments. This is a part of the teacher's duty.

G. Standard Certification of Teachers

A certificate of standard grade may be validated for the teaching of sight conservation classes on the completion of twenty semester hours of special preparation distributed as follows:

		Semester Hours Minimum Requirements	Maximum Allowance
1.	Experience Teaching in approved special classes of this type or in schools for the blind or approved teaching in other school work Experience may be counted up to 10 semester hours at the rate of 4 semester hours per year.	0	10
2.	Content Courses: In Education of the Blind, or Partially Blind, Psychology of Vision, Psychology of Atypical Children, Mental Tests, Physical Education, etc.	4	8
3.	Manual arts suited to the partially blind and typewriting	0	6
4.	Special Methods	6	8
	TOTAL	20	*

The foregoing applies to the organization and administration of special classes for partially sighted children between the ages of six and sixteen. In school districts not having a sufficient number of partially sighted children for the organization of a class, special provision should be made in the regular grades. This may be done by procuring the specially prepared textbooks and other necessary materials, through advantageous seating arrangements, and by granting such pupils freedom in moving about the room in order to obtain as distinct visual impressions as possible of instructional material. The necessary reading can be done by sighted pupils who can prepare assignments jointly with their partially sighted companion or companions.

* Credits beyond 20 semester hours may be as unassigned courses.

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